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Thomas W. Adams
(Type or print name of person submitting paper)

Date: September 17, 2007

/thomaswadams/
(Signature of person submitting paper)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Docket No: H1559

In re patent application of:			
Appellants:	Adam Pawloski, et al.	Art Unit:	1756
Serial No.:	10/790,457	Examiner:	Caleen O. Sullivan
Filing Date:	01 March 2004	Confirmation No.	9956

For: **METHOD FOR REMOVAL OF IMMERSION LITHOGRAPHY MEDIUM IN IMMERSION LITHOGRAPHY PROCESSES**

APPEAL BRIEF

VIA EFS
M/S Appeal Briefs - Patents
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

This Appeal Brief is submitted in the above-identified application in response to the final Office Action mailed 31 May 2007. Appellants' Notice of Appeal was filed via EFS on 24 July 2007. Accordingly, Appellants' Appeal Brief is timely filed, with no extension of time.

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TABLE OF CONTENTS

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APPEAL BRIEF

Commissioner of Patents
P.O. Box 1450
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Dear Sir:

This Appeal Brief is submitted in the above-identified application in response to the final Office Action mailed 31 May 2007. Appellants' Notice of Appeal was filed via EFS on 24 July 2007.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Advanced Micro Devices, Inc., One AMD Place, Sunnyvale, California 94088-3453. 37 C.F.R. §41.37(c)(1)(i).

II. RELATED APPEALS AND INTERFERENCES

Appellants are aware of no related appeals or interferences. 37 C.F.R. §41.37(c)(1)(ii).

III. STATUS OF CLAIMS

Claims 1-6, 8-13, 15-21 and 23 are pending in the application and stand finally rejected. Claims 7, 14 and 22 were previously canceled. Thus, all of claims 1-6, 8-13, 15-21 and 23 are subject to appeal. 37 C.F.R. §41.37(c)(1)(iii).

IV. STATUS OF AMENDMENT

An amendment under 37 C.F.R. 1.116(a) was filed in this application, and the Examiner issued an Advisory Action. Thus, at the present time, there is no amendment pending. 37 C.F.R. §41.37(c)(1)(iv).

V. SUMMARY OF CLAIMED SUBJECT MATTER.

Appellants' summary of the claimed subject matter is set forth in the following, in compliance with 37 C.F.R. §41.37(c)(1)(v):

Appellants' invention, in one embodiment as described in claim 1, beginning at p. 11, line 3 and shown in Fig. 4, relates to a process 400 for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer (Step 404, p. 11, lines 10-11);

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation having a selected wavelength (Step 406, p. 11, lines 19-21);

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer (Step 408, p. 12, lines 9-11); and

following the step of applying supercritical carbon dioxide to the wafer, obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide (Step 410) and recovering (Steps 412, p. 13, lines 10-11 and Step 414a, p. 14, lines 8-10)) and purifying the immersion lithography medium from the mixture (Step 418, p. 14, lines 11-15).

Appellants' invention, in one embodiment as described in claim 10, beginning at p. 11, line 3 and shown in Fig. 4, relates to a process 400 for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer (Step 404, p. 11, lines 10-11);

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation (Step 406, p. 11, lines 19-21) having a wavelength of about 157 nm (p. 11, line 22), the exposing comprising passing the radiation through the immersion lithography medium (Fig. 1);

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer (Step 408, p. 12, lines 9-11); and

following the step of applying supercritical carbon dioxide to the wafer, obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide (Step 410) and recovering (Steps 412, p. 13, lines 10-11 and Step 414a, p. 14, lines 8-10)) and purifying the immersion lithography medium from the mixture (Step 418, p. 14, lines 11-15); and

recycling the recovered and purified immersion lithography medium (Step 418 to Step 404).

Appellants' invention, in one embodiment as described in claim 16, beginning at p. 11, line 3 and shown in Fig. 4, relates to a process 400 for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer (Step 404, p. 11, lines 10-11), wherein the immersion lithography medium is substantially non-reactive with the material forming the surface of the semiconductor wafer (p. 11, lines 15-17) and is substantially transparent to the radiation (p. 11, lines 17-18);

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation (Step 406, p. 11, lines 19-21) having a wavelength of about 157 nm (p. 11, line

22), the exposing comprising passing the radiation through the immersion lithography medium (Fig. 1);

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer (Step 408, p. 12, lines 9-11); and

obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide (Step 410) and recovering (Steps 412, p. 13, lines 10-11 and Step 414a, p. 14, lines 8-10)) and purifying the immersion lithography medium from the mixture (Step 418, p. 14, lines 11-15).

As described in the claims, and described in detail in the specification, the claimed process provides a process for fabricating a semiconductor device including the use of immersion lithography, in which the immersion lithography fluid is applied to a surface, the surface and the fluid are exposed to electromagnetic radiation of a desired wavelength, and then the immersion lithography fluid, together with any debris or other reaction products, is removed by use of supercritical carbon dioxide. The mixture of supercritical carbon dioxide and lithography medium is then recovered, purified, and in some embodiments re-used in the same process.

The present invention addresses problems resulting from use of expensive immersion lithography fluids in immersion lithography processes, and avoids the need to dispose of the immersion lithography fluids after use. The invention also addresses the problem of removal of the immersion lithography fluid together with any debris or other reaction products or byproducts from the surface of a nascent semiconductor device while avoiding the many pitfalls involved in prior art cleaning materials, by the use of the supercritical carbon dioxide.

Thus, the present invention responds to the need in the art for a semiconductor fabricating process that is efficient, clean and non-contaminating to the nascent semiconductor device, is both economically and environmentally favorable, and is relatively simple and straightforward to carry out.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.

Appellants' concise statement of each ground of rejection presented for review is set forth in the following, in compliance with 37 C.F.R. §41.37(c)(1)(vi):

APPELLANTS' CLAIMS 1-6, 8-13, 15-21 and 23 STAND REJECTED UNDER 35 U.S.C. § 103(a) OVER SWITKES et al., IN VIEW OF U.S. PATENT 6,024,801 AND FURTHER IN VIEW OF U.S. PATENT 6,612,317.

VII. ARGUMENT

In compliance with 37 C.F.R. §41.37(c)(1)(vii), Appellants' argument with respect to each ground of rejection presented for review set forth above in accordance with paragraph (c)(1)(vi) follows.

A. Appellants' Claims 1-6, 8-13, 15-21 and 23 Would Not Have Been Obvious over Switkes et al., in View of Wallace, U.S. Patent 6,024,801 and Further in View of Constantini et al., U.S. Patent 6,612,317, Because the Combined References Fail to Teach All the Claimed Features.

Claims 1-6, 8-13, 15-21 and 23 stand rejected as obvious over the asserted combination of Switkes et al. ("Immersion Lithography at 157 nm"), Wallace, U.S. Patent No. 6,024,801 and Costantini et al., U.S. Patent No. 6,612,317. Appellants respectfully traverse these rejections for at least the following reasons, and request the Board to reverse the rejection of the claims over the asserted combinations of these references.

Section 103 states that an invention is unpatentable for obviousness "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter *as a whole* would have been obvious...." In rejecting claims as unpatentable for obviousness, the Examiner must show that the claimed invention *as a whole* would have been obvious. Appellants respectfully submit that the Examiner has failed to make such a showing and therefore there can be no *prima facie* obviousness in the present case.

Independent claims 1, 10 and 16, and therefore all of the claims depending on these claims, recite a process for fabricating a semiconductor device, including applying an immersion lithography medium to a surface of a semiconductor wafer; exposing a material on the surface of the semiconductor wafer to electromagnetic radiation having a selected wavelength; applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer; and following the step of applying supercritical carbon dioxide to the wafer, obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide and recovering and purifying the immersion lithography medium from the mixture. Claim 23 incorporates this subject matter and further specifies that the immersion lithography medium recovered from the mixture and purified exhibits substantially the same purity as the original immersion lithography medium applied to the surface of the semiconductor wafer, and that the process further comprises recycling the recovered and purified immersion lithography medium for use in immersion lithography. Because the cited references fail to disclose all the elements of Appellants' claimed invention, specifically the steps of recovering and purifying the immersion lithography fluid removed from the surface of the nascent semiconductor device, there can be no obviousness. Specifically, the purifying recovered immersion lithography fluid step is not disclosed in the cited references, there can be no *prima facie* case of obviousness which, as well known, requires all claim elements to be disclosed in the cited and relied upon prior art. Thus, Appellants respectfully submit that all of the claims are in condition for allowance, since the combined references applied against the presently pending claims fail to disclose or suggest all of the limitations of Appellants' claims, and as a result the claimed invention would have been obvious under 35 U.S.C. §103(a).

Specifically, although Switkes et al. and Wallace and Constantini et al. disclose some of the features of the presently claimed invention, these references fail to disclose or suggest all of the claimed features as recited in Appellants' claims. Specifically,

Constantini et al. fails to disclose recovering and purifying, and/or recovering, purifying and recycling for reuse in immersion lithography, the immersion lithography fluid.

Switkes et al. relates to immersion lithography at 157 nm. As admitted by the Examiner, Switkes et al. fails to disclose (or suggest) a step of applying a supercritical carbon dioxide to the wafer to remove the immersion lithography medium from the wafer. More importantly, and in addition, Switkes et al. fails to disclose or suggest anything about removing the medium, or recovering it or purifying it.

Wallace relates to use of supercritical fluids such as carbon dioxide to remove substances from a nascent semiconductor wafer, retaining the wafer in the chamber in which the supercritical fluid was applied and then passivating the surface, prior to exposure to atmospheric air. Wallace has nothing to do with immersion lithography. Wallace does not even mention lithography. Wallace is completely irrelevant to the present invention except for its use of supercritical carbon dioxide to clean a surface.

The Examiner's reference to the use of UV to remove a fluorocarbon from the surface is completely irrelevant. Use of this disclosure to justify the use of Wallace reveals the hindsight applied in formulating this rejection. The UV is applied to remove the fluorocarbon after any other processing, which can only mean that the UV helps to break up the fluorocarbon through some kind of chemical reaction. In the present invention, the UV is applied not to remove the immersion lithography fluid, not to react with it, but to simply pass through the fluid to react with other structures and, as any person of ordinary skill in the art would readily understand, the UV is desired to not react with the immersion lithography fluid. This is just opposite of what Wallace teaches relating to UV and the fluorocarbon.

At page 4, in the full paragraph, the Examiner admitted that Switkes et al. in combination with Wallace fails to disclose the applying of supercritical fluid to the surface to remove the mixture of immersion lithography medium, and recovering and purifying the immersion lithography medium. The Examiner further admitted that Switkes et al. in

combination with Wallace fails to disclose the limits of claims 8, 15 and 19, and the limitations of claims 20, 21 and 23, and the limitations of claims 10 and 23.

So, the Examiner resorted to and relied upon Constantini et al. to fill all these admitted gaps and non-disclosures in the primary and secondary references. Unfortunately, as Appellants have repeatedly argued and shown factually, Constantini et al. fails to disclose all of the disclosure missing from Switkes et al. and Wallace. Even with the addition of Constantini et al. the Examiner has still failed to identify all of the claimed features of the present invention in the prior art. Because Constantini et al. is so essential to the Examiner's position, it is discussed extensively in the following, which clearly reveals the Examiner's failure to state a *prima facie* case of obviousness.

Constantini et al. discloses use and recovery of a co-solvent, not of an immersion lithography fluid. There is no disclosure in Constantini et al. teaching or suggesting the use of an immersion lithography fluid, and therefore there cannot be any teaching or suggestion that such a fluid could be recovered and recycled. Constantini et al. discloses supercritical phase cleaning and processing of semiconductor wafers as for removal of solvents, photo-resist materials, and loose particulate matter. Col. 1, lines13-15. But, Constantini et al. does not disclose recovery of anything but the co-solvent. Constantini et al. teaches discarding the other materials. Col. 10, lines 22-37.

Constantini et al. discloses, at col. 5, lines 15-40, that the co-solvent, with or without an additional surfactant, is provided to the system together with the super critical fluid ("SCF"). As disclosed at col. 6, lines 40-56, the co-solvent is separated and purified for re-use. The fact that the co-solvent and surfactant (if any) are added with the SCF indicates that these are part of the removal and cleaning materials, not of the material to be removed from the semiconductor surface. There is no disclosure that the co-solvent is any material such as an immersion lithography fluid. There would be no reason to use such a material for this purpose. There is no specific teaching in Constantini et al. of the identity of the co-solvent, so it must be defined as would be understood by a person of skill in the art of supercritical fluids, e.g., as a solvent such as

a traditional organic solvent. See, e.g., U.S. Patent No. 6,562,146, col. 5, lines 51-60, listing a variety of traditional organic solvents that can be used as co-solvent in a SCF cleaning process. Certainly there is no suggestion in Constantini et al. to employ an immersion lithography fluid as a co-solvent.

Appellants respectfully submit that all of the presently pending claims patentably distinguish over the cited references. Appellants respectfully request the Board to reverse the Examiner's rejection of the claims.

To establish a *prima facie* case of obviousness, the Examiner must establish that *the prior art references teach or suggest all the claim limitations*. See MPEP 706.02(j)). If all the claim limitations are not found, then there can be no obviousness because the invention as a whole was not in the prior art.

In the present case, as shown above, the asserted combination of prior art references fail to teach or suggest all the claim limitations. Appellants' claims specify, inter alia, the step of recovering and purifying the immersion lithography fluid, and the cited references fail to disclose this feature of Appellants' claims. For this reason alone, there is no *prima facie* case of obviousness in the present case.

Failing to teach or suggest all the claim limitations, there can have been no motivation to combine the reference teachings. Failing to teach or suggest all the claim limitations and absent any motivation, there can have been no reasonable expectation of success.

"Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed. Cir. 1998). There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them *as combined by the inventor*. This is simply another way of stating that it is *the invention as a whole* that must be shown to have been obvious.

Appellants submit that the Examiner has failed to carry this burden. Specifically, Appellants submit that the Examiner has read into the cited references the feature of recovering and purifying the immersion lithography fluid, since none of the cited references disclose this feature.

Although in KSR, the Supreme Court found that the strict application of the teaching, suggestion or motivation test was not required, the Court nevertheless stated that the PTO must provide sound reasons for rejecting a claim as obvious. *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742 (2007). The Court also stated that merely because a patent claim requires several elements all of which are known from the prior art, this does not necessarily mean the invention as a whole would have been obvious:

> [A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. . . . This is so because inventions in most, if not all instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

Id. at 1741. Thus, the Examiner must still show some factual reason for the selection and combination and modification of elements taken from the prior art. Here, Appellants respectfully submit that the Examiner has failed to carry this burden, since there is nothing in the cited references to suggest the claimed invention *as a whole*.

Accordingly, for these additional reasons, there is no *prima facie* case of obviousness in the present case. Accordingly, Appellants respectfully request the Board to reverse the Examiner's rejections of Appellants' presently pending claims over Switkes et al., Wallace and Costantini et al.

A more detailed discussion of the actual disclosures of Constantini et al. is presented in the following and, Appellants respectfully submit, clearly reveals that the Examiner has failed to state a *prima facie* case of obviousness in the rejections appealed from herein, for which reversal of the rejections is respectfully requested.

B. Constantini et al. Fails to Teach or Suggest Recovery and Purification for Re-use of the Immersion Lithography Fluid.

Costantini et al. fails to disclose or suggest recovery and purification of the immersion lithography medium from the mixture, as claimed. Appellants respectfully submit that the Examiner's reading of Costantini et al. is incorrect to the extent the Examiner contends that the teachings are applicable to an immersion lithography fluid as claimed. The co-solvent used by Costantini et al. is not an immersion lithography fluid, and the process of Costantini et al. applied to the co-solvent cannot be applied to an immersion fluid as claimed. The only portion of the material removed from the Costantini et al. process that even approximately corresponds to Appellants' immersion lithography fluid is the "waste" referred to, for example, at col. 6, line 57. At this point, with respect to the further handling of this waste, the process of Costantini et al. is at a dead end. To contend otherwise is to extrapolate the teachings of Costantini et al. beyond any fair reading thereof.

Accordingly, Appellants respectfully submit that there is no *prima facie* case of obviousness in the present case, since all the limitations of the claims have not been disclosed or even fairly suggested by the asserted assemblage of Switkes et al., Wallace, and Costantini et al. Appellants reiterate their request for reconsideration and withdrawal of the rejections.

Costantini et al. discloses use and recovery of a co-solvent, not of an immersion lithography fluid. There is no disclosure in Costantini et al. teaching or suggesting the use of an immersion lithography fluid, and therefore there cannot be any teaching or suggestion that such a fluid could be recovered and recycled. Costantini et al. discloses supercritical phase cleaning and processing of semiconductor wafers as for removal of solvents, photo-resist materials, and loose particulate matter. Col. 1, lines 13-15. But, Costantini et al. does not disclose recovery and purification for re-use of anything but the co-solvent. Costantini et al. teaches the other materials are "waste". See, e.g., col. 6, line 55-56 and col. 10, lines 30-31.

Constantini et al. teaches that the co-solvent is mixed with the supercritical fluid prior to the application of same to the semiconductor device. If the Costantini et al. co-solvent were the same as Appellants' immersion lithography fluid, the immersion lithography fluid would only be provided to the wafer together with, i.e., already mixed with, the super-critical fluid, not for use in immersion lithography as claimed. Doing so would destroy the purpose both of Constantini et al. and of Appellants' claimed invention. An immersion lithography fluid cannot be applied after the immersion lithography together with the agent used to clean the exposed device! This is not anything like what Appellants disclose and claim. Appellants' claims cannot be fairly read upon or alleged to have been rendered obvious by such a different material used in such a different way at a different time in the process. In Appellants' disclosed and claimed process, the immersion lithography fluid is provided for use in immersion lithography, and then it, together with any other waste materials, is removed by the supercritical carbon dioxide and optional co-solvent. While a co-solvent may obviously be combined with the supercritical carbon dioxide and, as disclosed by Costantini et al., both the carbon dioxide and the co-solvent can be recovered and reused, this is not at all the same as, and cannot reasonably be contended to have rendered obvious, what Appellants have disclosed and claimed in the immersion lithography process of the present invention.

There simply is nothing in Costantini et al. or the other cited references that discloses or would even suggest what Appellants have claimed in the present application.

Regarding the process at the point where the supercritical carbon dioxide and any co-solvent have been applied to the wafer and passed into the recovery section, Costantini discloses, at col. 6, lines 11-13:

> The recovered solvent or mixture may contain suspended or dissolved components from process chamber 37, and is now called "effluent".

The carbon dioxide, any co-solvent, any debris from the process and the immersion lithography fluid would be included in the "effluent".

Costantini et al. discloses, at col. 6, lines 27-34:

> Under the temperature and pressure conditions just described, the effluent separates into a vapor phase and a liquid phase.
>
> The vapor phase contains the gas or gas mixture originally supplied by feed pump 23, and a small fraction of co-solvent or dissolved liquid or solid from the wafer in process chamber 37, based on its solubility in the gas under the conditions in the separator.

Thus, the carbon dioxide and, possibly, a small amount of other materials, are in the vapor phase. As disclosed by Costantini et al. at col. 6, lines 40-44:

> The liquid phase contains the co-solvent and any dissolved or suspended components removed in process chamber 37, and a small fraction of gas, based on the solubility of the gas in the co-solvent, under the conditions in the separator.

The immersion lithography fluid clearly would be included in this liquid phase.

As disclosed by Costantini et al. at col. 6, lines 40-44:

> The liquid phase passes into separator 61, monitored by level transmitter 79, temperature transmitter 60, and heated by heater 62. Heater 62 heats the liquid phase to boiling at atmospheric pressure, to provide for separation into a vapor-phase containing the co-solvent, at suitable purity to be re-used in the process previously described, and a liquid-phase containing any remaining contamination, and sufficient liquid, if any, needed to maintain a fluid state. The liquid phase is now called waste.

Here it is quite clear that the immersion lithography fluid would be included in the "liquid-phase containing any remaining contamination" which is then designated as

"waste". There is no suggestion that anything other than the co-solvent could be in the vapor phase.

It is most noteworthy that only the co-solvent is removed at "suitable purity to be re-used in the process". The closest that Costantini et al. comes to any possible re-use of the "waste" is at col. 6, lines 57-62:

> The waste is discharged as needed through isolation valves 64 and 63 to holding tank 65, which is cooled by chiller 66 and monitored by temperature transmitter 71 to ambient conditions. Tank 65 is removed for disposal or recovery of its contents as needed by closing isolation valves 63 and 64 and disconnecting the line between them.

Any fair and appropriate reading of this disclosure would suggest, at best, that components of the waste that are not acceptable for disposal, e.g., for environmental reasons, should be recovered. At this point, with respect to any further handling of this waste, the process of Costantini et al. has reached a dead end. There is not one word to suggest that any particular waste component should or could be recovered, purified and reused, and there is not one word to suggest that any component of the waste or any other part of the Costantini et al. process includes an immersion lithography fluid. Finally, there is not one word in Costantini et al., except possibly in hindsight, to suggest that any component of the process could include an immersion lithography fluid that could be purified for re-use.

Finally, if Constantini et al. had intended for a valuable component such as an immersion lithography fluid to be recovered, purified and re-used, the reference certainly would have so stated. The fact that it did not can mean only that such is beyond the teaching or any possible suggestion that can fairly be drawn from this reference in the absence of improper hindsight reconstruction of Appellants' invention.

For these reasons, Appellants respectfully submit that there is and can be stated no *prima facie* case of obviousness of Appellants' claimed invention.

Accordingly, Appellants respectfully request the Examiner to withdraw the rejections of Appellants' presently pending claims over Switkes et al., Wallace and Costantini et al.

Appellants respectfully submit that all of the presently pending claims patentably distinguish over the cited references. Appellants respectfully request the Examiner to withdraw the rejection of the claims.

C. Claim 23 Would Not Have Been Obvious over the Combined References.

Claim 23 depends from claim 1 and states that the immersion lithography medium recovered from the mixture and purified exhibits substantially the same purity as the immersion lithography medium applied to the surface of the semiconductor wafer, and the process further comprises recycling the recovered and purified immersion lithography medium for use in immersion lithography. This claim extends the claimed invention to include purification to a degree sufficient that the recycled material can be used in the same way as the original material. Since, for the reasons set forth above, the combined prior art references fail to disclose the recovery and purification of the immersion lithography fluid, there simply can be no reasonable contention that the additional features of claim 23 were either disclosed or suggested in the prior art references cited and relied upon in rejection of Appellants' claims.

For this additional reason, claim 23 fully distinguishes over the prior art and the Board is requested to reverse the rejection thereof.

D. The Arguments of the Examiner in the Final Office Action and Advisory Action Are Based on Incorrect "Facts", an Overbroad Reading of the References and Do Not Credit All the Features of Appellants' Claims.

The Examiner's clearly erroneous reading of the prior art is the basis upon which the rejections stand. That is, the Examiner contends that Appellants' reading of the disclosures of the prior art is unduly narrow. In fact, it is the Examiner's reading of the

prior art references which is overly broad, attributing disclosure or suggestion that is simply not present. The discussion in Constantini et al., as pointed out above in detail, applies only to the carbon dioxide and the co-solvent, not to the immersion lithography fluid. Every instance cited by the Examiner as allegedly teaching recovery and purification of the immersion lithography fluid actually applied to the co-solvent, not to any immersion lithography fluid. There is nothing that fairly suggests the recovery and purification, and in some embodiments, re-use as if new, of the immersion lithography fluid. The only way such can be gleaned from Constantini et al. is by improper use of hindsight reconstruction based on Appellants' invention. Thus, the Examiner's reading of Constantini et al. is clearly erroneous and lacks support of substantial evidence.

In the response to Appellants' arguments in the final Office Action and in the Advisory Action, the Examiner admitted that Constantini et al. does not explicitly teach that the effluent recovered consists of immersion lithography fluid, but contends that this would have been obvious. This is a clear case of the Examiner reading into the reference something which is simply not there. This is clearly erroneous, and there is no substantial evidence to support the Examiner's position.

Thus, as shown throughout this Appeal Brief, there is simply no factual basis, and therefore no substantial evidence, to support the rejection of Appellants' claims as obvious over the combination of Switkes et al. Wallace and Constantini et al. as maintained by the Examiner. Applicants' claims include features not disclosed or suggested in the cited references, as shown in detail in the foregoing. Thus, the Examiner has failed to credit all the features of Appellants' claimed invention.

Finally, Appellants respectfully submit that the foregoing obviousness contentions in the Office Actions in this case are based on an improper piecemeal analysis, one that can only have resulted from an improper hindsight reconstruction of Appellants' claimed invention. The Examiner failed to state a legally correct *prima facie* case of obviousness, since the Examiner failed to consider the claimed invention as a whole as is required by the law, the Rules of Practice and the MPEP.

Accordingly, Appellants request the Board to reverse the Examiner's rejection of Appellants' claims over the contended combination of references, none of which in any combination support a factually correct and legally proper *prima facie* case of obviousness.

IX. CONCLUSION

For all these reasons, the rejection of Appellants' claims 1-6, 8-13, 15-21 and 23 under 35 U.S.C. §103(a) should be reversed. Appellants respectfully request reversal of the Examiner's rejections of Appellants' claimed invention. Appellant respectfully submits that all of the pending claims are in condition for allowance, and respectfully request notice to such effect from the Examiner and/or the Board.

In the event issues remain in the prosecution of this application, Appellants request that the Examiner telephone the undersigned attorney to expedite further consideration and/or allowance of the claims of this application. Should a Petition for Extension of Time be necessary for the present Appeal Brief to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. H1559, AMDSPH1559US.

Respectfully submitted,
RENNER, OTTO, BOISSELLE & SKLAR

Date: September 17, 2007

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X. APPENDICES:

CLAIMS SUBJECT TO APPEAL

In accordance with 37 C.F.R. §41.37(c)(1)(viii), the following claims 1-6, 8-13, 15-21 and 23 are the subject of the present appeal:

1. A process for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer;

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation having a selected wavelength;

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer; and

following the step of applying supercritical carbon dioxide to the wafer, obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide and recovering and purifying the immersion lithography medium from the mixture.

2. A process as in claim 1 wherein the immersion lithography medium is a fluoropolymer.

3. A process as in claim 1 wherein the immersion lithography medium is substantially non-reactive with the material forming the surface of the semiconductor wafer and is substantially transparent to the radiation.

4. A process as in claim 1 wherein the selected wavelength is in a range from about 11 nm to about 400 nm.

5. A process as in claim 1 wherein the selected wavelength is about 157 nm.

6. A process as in claim 1 wherein the material forming the surface of the semiconductor wafer is photosensitive to the selected wavelength.

7. (Cancelled)

8. A process as in claim 1, wherein recovering includes reducing pressure and/or temperature of the mixture and removing carbon dioxide from the mixture.

9. A process as in claim 1, wherein exposing comprises passing the radiation through the immersion lithography medium.

10. A process for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer;

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation having a wavelength of about 157 nm, the exposing comprising passing the radiation through the immersion lithography medium;

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer; and

following the step of applying supercritical carbon dioxide to the wafer, obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide and recovering and purifying the immersion lithography medium from the mixture; and

recycling the recovered and purified immersion lithography medium.

11. A process as in claim 10 wherein the immersion lithography medium is a fluoropolymer.

12. A process as in claim 10 wherein the immersion lithography medium is substantially non-reactive with the material forming the surface of the semiconductor wafer and is substantially transparent to the radiation.

13. A process as in claim 10 wherein the material forming the surface of the semiconductor wafer is photosensitive to the selected wavelength.

14. (Cancelled)

15. A process as in claim 10, wherein recovering includes reducing pressure and/or temperature of the mixture and removing carbon dioxide from the mixture.

16. A process for fabricating a semiconductor device, comprising:

applying an immersion lithography medium to a surface of a semiconductor wafer, wherein the immersion lithography medium is substantially non-reactive with the material forming the surface of the semiconductor wafer and is substantially transparent to the radiation;

exposing a material on the surface of the semiconductor wafer to electromagnetic radiation having a wavelength of about 157 nm, the exposing comprising passing the radiation through the immersion lithography medium;

applying supercritical carbon dioxide to the semiconductor wafer to remove the immersion lithography medium from the surface of the semiconductor wafer; and

obtaining a mixture of the immersion lithography medium removed from the surface and carbon dioxide and recovering and purifying the immersion lithography medium from the mixture.

17. A process as in claim 16 wherein the immersion lithography medium is a fluoropolymer.

18. A process as in claim 16 wherein the material forming the surface of the semiconductor wafer is photosensitive to the radiation.

19. A process as in claim 16, wherein recovering includes reducing pressure and/or temperature of the mixture and removing carbon dioxide from the mixture.

20. A process as in claim 16, wherein the immersion lithography medium recovered from the mixture exhibits substantially the same chemical composition and/or substantially the same purity as the immersion lithography medium applied to a surface of the semiconductor wafer.

21. A process as in claim 1, wherein the immersion lithography medium recovered from the mixture and purified exhibits substantially the same chemical composition and/or substantially the same purity as the immersion lithography medium applied to a surface of the semiconductor wafer.

22. (Cancelled)

23. A process as in claim 1, wherein the immersion lithography medium recovered from the mixture and purified exhibits substantially the same purity as the immersion lithography medium applied to the surface of the semiconductor wafer, and the process further comprises recycling the recovered and purified immersion lithography medium for use in immersion lithography.

EVIDENCE

In accordance with 37 C.F.R. §41.37(c)(1)(ix), Appellants note that in the present application, evidence was submitted pursuant to 37 C.F.R. § 1.131, and was entered by the examiner. Following submission of this evidence, the previously asserted grounds of rejection were withdrawn. Thus, the evidence is not directly relied upon by Appellants in the appeal. However, for completeness and because Appellants believe the Rules to require submission of this evidence, a copy of the evidence submitted pursuant to 37 C.F.R. § 1.131, together with its Exhibits, is included with this Appeal Brief.

RELATED PROCEEDINGS

In accordance with 37 C.F.R. §41.37(c)(1)(x), Appellants note that in the present application there are no related proceedings; therefore there is no documentation relating to such proceedings.

H1559

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application:

Applicant:	Adam R. Pawloski, et al.	Art Unit:	1756
Serial No.:	10/790,457	Examiner:	Caleen O. Sullivan
Filed:	01 March 2004	Confirmation No.	9956

Title: METHOD FOR REMOVAL OF IMMERSION LITHOGRAPHY MEDIUM IN IMMERSION LITHOGRAPHY PROCESSES

DECLARATION UNDER 37 C.F.R. §1.131

VIA EFS
M/S Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Sir:

I, Adam R. Pawloski, declare and say as follows:

I, Amr Y. Abdo, declare and say as follows:

I, Gilles R. Amblard, declare and say as follows:

I, Bruno M. LaFontaine, declare and say as follows:

I, Ivan Lalovic, declare and say as follows:

I, Harry J. Levinson, declare and say as follows:

I, Jeffrey A. Schefske, declare and say as follows:

I, Cyrus E. Tabery, declare and say as follows:

I, Frank Tsai, declare and say as follows:

(1) Each of us is a co-inventor of the claimed invention of the above-identified patent application. This Declaration is submitted to establish conception of the invention

described and claimed in the above-identified application in the United States at a date prior to 11 March 2003, which is the U.S. filing date of U.S. Application No. 10/386,356, which was published as U.S. Patent Application Publication No. US 2004/0180299 A1, and diligence, from a time prior to 11 March 2003 until the 01 March 2004 filing date of our present, above-identified U.S. Application No. 10/790,457, at which time our invention was constructively reduced to practice.

(2) To establish completion of the invention claimed in the above-identified application prior to 11 March 2003, copies of two pages of an AMD Invention Disclosure form, which describes completion of the invention in this country, are enclosed with this Declaration as Exhibits A, B, C and D. Exhibits A, B, C and D are four pages of the AMD Invention Disclosure, which was assigned ID# H1559.

(3) Advanced Micro Devices, Inc. ("AMD") is the assignee of the above-identified patent application. The invention described in these Exhibits A, B, C and D was completed prior to 11 March 2003. (The actual dates and certain personal information contained on the Exhibit documents have been removed from the copies submitted herewith.)

(4) Exhibit A is a copy of page 1 of the AMD Invention Disclosure ID# H1559. Exhibit A shows the title of the invention "Low Molecular Weight Fluoropolymers for immersion lithography." While this title is different from that of the patent application, it is descriptive of the field of the invention. Exhibit A also shows that while one of us, Adam R. Pawloski, was identified as the first inventor (as in the above-identified application, the lead inventor), Exhibit A shows "List All Participants Pg 1A" as co-inventors. At the bottom of the page of Exhibit A, the total number of inventors is stated as being "9". The above-referenced Pg 1A is attached hereto as Exhibit C, which shows that the nine inventors are Adam R. Pawloski, Amr Y. Abdo, Gilles R. Amblard, Bruno M. LaFontaine, Ivan Lalovic, Harry J. Levinson, Jeffrey A. Schefske, Cyrus E. Tabery and Frank Tsai. We, the undersigned, are the nine co-inventors indicated in Exhibits A and C.

(5) Exhibit A further indicates that the use of the invention is for "immersion lithography" and that the key search words related to the invention are "immersion fluid" and "supercritical CO_2".

(6) Exhibit A further shows that the Invention Disclosure was witnessed by two attorneys from the law firm by which our attorney is employed, Renner, Otto, Boisselle & Sklar LLP. These witnessing attorneys are Warren A. Sklar and Thomas W. Adams. The lead attorney for this application is Thomas W. Adams, and Mr. Adams has had responsibility for the present application from the time of conception up to the present. It is our understanding that AMD assigned attorney docket number H1559, and that Mr. Adams' law firm assigned attorney docket number AMDSPH1559US to their file for the above-identified application based on the AMD Invention Disclosure ID# H1559.

(7) Exhibit B is a copy of page 2 of the AMD Invention Disclosure ID# H1559. Exhibit B includes a statement that the problem solved by the invention was that "The fluids used in an immersion lithography system must be removed from the wafer after exposure without leaving residue and by methods that do not heat the wafer." The problem solved by the invention further states that "Supercritical CO_2 can be used to dissolve away these low molecular weight materials without leaving residue or heating the wafer."

(8) Exhibit B includes the following brief description of the invention:

> For immersion lithography systems a transparent fluid must be found to fill the space between the photoresist and the objective lens of the optical system.
>
> Fluoropolymers are good choices because they (1) are chemically inert (2) are very transparent at 248 nm, 193 nm and 157 nm and (3) low molecular weight species can be dissolved in supercritical CO_2
>
> This drying step does not require heating of the resist film (thus not impacting the image formation process after exposure)

(9) Exhibit B includes a diagram illustrating the application of electromagnetic radiation ("exposure light") from a lens through an immersion fluid to a resist including an exposure region, in which the resist is on the surface of a substrate (such as a semiconductor wafer). The diagram indicates that supercritical CO_2 is applied to remove the low molecular weight fluid, leading to (as indicated by the arrow) a dry sample of the substrate and resist, free of the immersion fluid.

(10) The foregoing brief description of the invention in Exhibit B specifically used supercritical CO_2 for the purpose of removing an immersion lithography medium after exposure of a material on the surface of a semiconductor wafer to electromagnetic radiation. This disclosure is the same as what is disclosed and, as we understand, is being claimed, in the above-identified application, of which each of us is a co-inventor.

(11) Exhibit C is a copy of page 1A of the AMD Invention Disclosure ID# H1559. As stated above, Exhibit C, from which personal information has been redacted, lists each of the nine undersigned persons as co-inventors, as referenced on Exhibit A.

(12) Exhibit D is a copy of page 3 of the AMD Invention Disclosure ID# H1559. Exhibit D shows that the stated advantages of the invention over other solutions is "Removal of immersion fluid without leaving residue and without heating the wafer."

(13) In view of Exhibits A, B, C and D, it can be seen that the invention claimed in the above-identified application was conceived in this country prior to 11 March 2003.

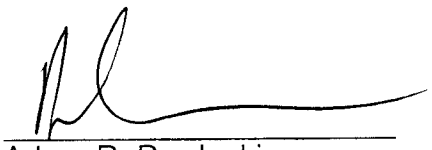
(14) From a time prior to 11 March 2003, our attorneys, the assignee Advanced Micro Devices, Inc., and each of us were diligent in constructively reducing the above-identified invention to practice by filing the above-identified application on 01 March 2004. On information and belief, our attorney, Mr. Adams, was actively working on preparation of the above-identified application during the period from when AMD transmitted the invention disclosure shown in Exhibits A, B, C and D together with authorization to prepare a patent application, until Mr. Adams completed the preparation of the draft application and submitted it to us for review. Upon our approval of the draft, our attorney completed the application and submitted it together with the formal papers (Declaration and Power of Attorney, Assignment, etc.) to the AMD legal department. When the AMD legal department received the application and formal papers, they presented these papers to us for execution. After we reviewed and executed the formal papers, the AMD legal department returned the application and executed formal papers to our attorney for filing. On information and belief, our attorney filed the application immediately upon authorization by the AMD legal department. To the best of our knowledge and belief there was no

inactivity with respect to the above-identified application during the period from just prior to 11 March 2003, until the filing date of the above-identified application, 01 March 2004.

Each of us, Adam R. Pawloski, Amr Y. Abdo, Gilles R. Amblard, Bruno M. LaFontaine, Ivan Lalovic, Harry J. Levinson, Jeffrey A. Schefske, Cyrus E. Tabery and Frank Tsai, further sayeth naught. Our signatures are provided on the following page together with the acknowledgment of our responsibilities under the law.

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Respectfully submitted,



Adam R. Pawloski

12/13/06
Date

Amr Y. Abdo

Date

Gilles R. Amblard

Date

Bruno M. LaFontaine

Date

Ivan Lalovic

Date

Harry J. Levinson

Date

Jeffrey A. Schefske

Date

Cyrus E. Tabery

Date

Frank Tsai

Date

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

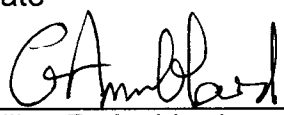
Respectfully submitted,

Adam R. Pawloski

Date

Amr Y. Abdo

Date



Gilles R. Amblard

1/11/2007

Date

Bruno M. LaFontaine

Date

Ivan Lalovic

Date

Harry J. Levinson

Date

Jeffrey A. Schefske

Date

Cyrus E. Tabery

Date

Frank Tsai

Date

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Respectfully submitted,

Adam R. Pawloski

Date

Amr Y. Abdo

Date

Gilles R. Amblard

Date

Bruno M. LaFontaine

Date

Ivan Lalovic

12-15-2006
Date

Harry J. Levinson

Date

Jeffrey A. Schefske

Date

Cyrus E. Tabery

Date

Frank Tsai

Date

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Respectfully submitted,

Adam R. Pawloski

Date

Amr Y. Abdo

Date

Gilles R. Amblard

Date

Bruno M. LaFontaine

Date

Ivan Lalovic

Date

Harry J. Levinson

Date

Jeffrey A. Schefske

Date 1/4/07

Cyrus E. Tabery

Date

Frank Tsai

Date

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Respectfully submitted,

Adam R. Pawloski

Date

Amr Y. Abdo

Date

Gilles R. Amblard

Date

Bruno M. LaFontaine

1/4/2007

Date

Ivan Lalovic

Date

Harry J. Levinson

12/6/06

Date

Jeffrey A. Schefske

Date

Cyrus E. Tabery

Jun 3, 2006

Date

Frank Tsai

12/07/06

Date

I, Adam R. Pawloski, and I, Amr Y. Abdo, and I, Gilles R. Amblard, and I, Bruno M. LaFontaine, and I, Ivan Lalovic, and I, Harry J. Levinson, and I, Jeffrey A. Schefske, and I, Cyrus E. Tabery, and I, Frank Tsai,, hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Respectfully submitted,

Adam R. Pawloski

Date

Amr Y. Abdo

1/9/2007

Date

Gilles R. Amblard

Date

Bruno M. LaFontaine

Date

Ivan Lalovic

Date

Harry J. Levinson

Date

Jeffrey A. Schefske

Date

Cyrus E. Tabery

Date

Frank Tsai

Date

(31) 1-39

TDG LITHO PATENT HARVESTING
Breakout Session: NGL Lithography **Technical Leader: Harry Levinson** **Classroom: C-1 & C-2**

AMD INVENTION DISCLOSURE TLD ID# H1559 Rec'd date _____
California & Asia: x44760, return to MS68; Texas: x55964 return to MS562; Dresden & Europe: x83401 Silke Kretzschmar at MS E21-PP.

This invention applies to: **Project:** ☐, **Product:** ☐, **Process:** ☑, **Technology** ☐, **Other** ☐,
IMPORTANT Please identify any potential use: immersion lithography
List 2 to 5 key search words related to the invention: immersion fluid, supercritical CO_2

Working title of invention: Low Molecular Weight Fluoropolymers for immersion lithography

INVENTOR/SESSION PARTICIPANT ADDRESS INFORMATION IS ON THE NEXT PAGE (1A)

Inventor's signature : _____ **date** :_
Inventor's printed full name: Adam Pawloski Citizenship:_____
Employee #:_____ Extension:_____ Mail stop:_____ Home telephone( )_____
AMD email address:_____ AMD office FAX( )_____
Division:_____ Directorate:_____ Dept #:_____ Dept :_____ Manager:_____
Residence address:_____
Post Office address:_____

Co-Inventor's signature : List All Participants Pg 1A date :_____
Co-Inventor's printed full name:_____ Citizenship:_____
Employee #:_____ Extension:_____ Mail stop:_____ Home telephone( )_____
AMD email address:_____ AMD office FAX( )_____
Division:_____ Directorate:_____ Dept #:_____ Dept :_____ Manager:_____
Residence address:_____
Post Office address:_____

Co-Inventor's signature :_____ date :_____
Co-Inventor's printed full name:_____ Citizenship:_____
Employee #:_____ Extension:_____ Mail stop:_____ Home telephone( )_____
AMD email address:_____ AMD office F
Division:_____ Directorate:_____ Dept #:_____ Dept :_____ Manager:_____
Residence address:_____
Post Office address:_____

EXHIBIT A

Co-Inventor's signature :_____ date :_____
Co-Inventor's printed full name:_____ Citizenship:_____
Employee #:_____ Extension:_____ Mail stop:_____ Home telephone:( )_____
AMD email address:_____ AMD office FAX:( )_____
Division:_____ Directorate:_____ Dept #:_____ Dept :_____ Manager:_____
Residence address:_____
Post Office address:_____

HARVESTING LAW FIRM/ATTORNEYS: RENNER, OTTO, BOISSELLE & SKLAR
Warren Sklar, Tom Adams

State total number of inventors here: 9 . If there are more than four inventors, insert duplicate page 1.

Witness 1 initial: _____ Witness 2 initial: _____

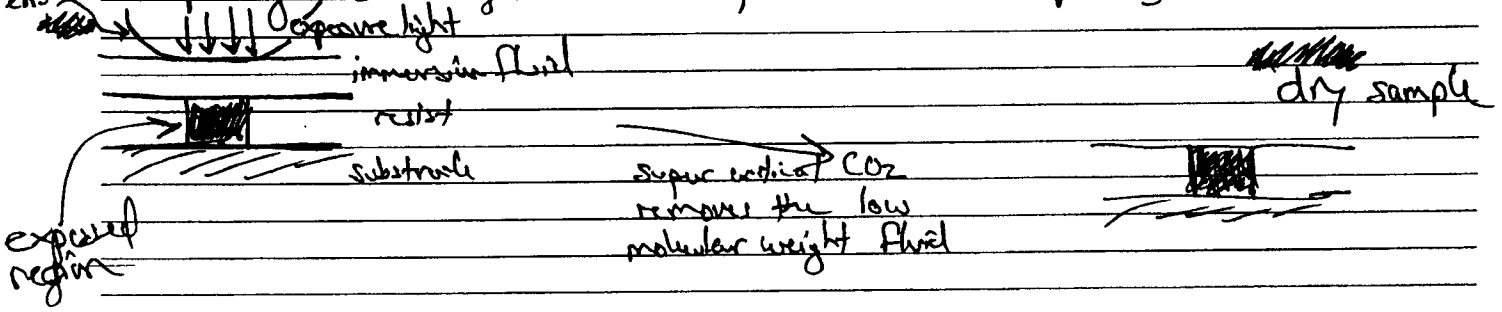
Identify known relevant art (patents, publications, other information):
- Supercritical CO_2 (carbon dioxide) extraction of fluorinated species
- Immersion lithography fluids

State the problem solved by the invention: The fluid used in an immersion lithography system must be removed from the water after exposure without leaving residue and by methods that do not heat the water. Supercritical CO_2 can be used to dissolve away these low molecular weight materials without leaving residue or heating the water.

Brief description and sketch of the invention (***please attach*** *copies of documents like AMD patent notebook pages, reports and drawings that are helpful indescribing / understanding the invention*):
For immersion lithography systems a transparent fluid must be found to fill the space between the photoresist and the objective lens of the optical system.

⇒ Fluoropolymers are good choice because they ① are chemically inert ② are very transparent at 248nm, 193nm and 157nm and ③ low molecular weight species can be dissolved in supercritical CO_2

This drying step does not require heating of the resist film (thus not impacting the image formation process after exposure)



Patent notebook # _____ Page numbers_____ Number of drawings_____

EXHIBIT B

Witness 1 initial: _____ Witness 2 initial: _____

TDG Litho Patent Harvesting -

Breakout Session: NGL Lithography - Classroom: C-1 & C-2 **Technical Leader: Harry Levinson**

Inventors' Name	Email	Citizenship	EE No.	Dept No.	Mail Stop	Work Telephone No.	Fax No.	Residence Address	Post Office Address
Abdo, Amr Y.	amr.abdo@amd.com	Egypt							
Amblard, Gilles R.	gilles.amblard@amd.com	France							
LaFontaine, Bruno M.	bruno.lafontaine@amd.com	Canada							
Lalovic, Ivan	ivan.lalovic@amd.com	USA							
Levinson, Harry J.	harry.levinson@amd.com	USA							
Pawloski, Adam R.	adam.pawloski@amd.com	USA							
Schefske, Jeffrey A.	jeffrey.schefske@amd.com	USA							
Tabery, Cyrus E.	cyrus.tabery@amd.com	USA							
Tsai, Frank	frank.tsai@amd.com	Taiwan							

Advantages (check all that apply):

☑ simplifies manufacturing	☑ improves accuracy / precision	☐ reduces component parts
☐ reduces cost of manufacturing	☑ improves reliability	☐ improves signal to noise ratio
☐ improves density	☑ improves efficiency	☑ provides new functionality
☐ increases operating speed	☑ increases operating range	☐ other, explain below

Discussion of advantage(s) of the invention over other solutions
(*emphasize technical advance in the art* as measured against known art): Removal of immersion fluid without leaving residue and without heating the water.

Please *take special care to* ***preserve documentary evidence of the original date of conception of the invention.***
AMD Inventors' notebooks with witness signatures are useful in this regard. Notebooks are issued on request to inventors by the local AMD site Technical Librarian.

Please attach copy of first written description(s) of invention, with dates, names of persons with whom the description was discussed.
Please attach copy of first drawing(s) of invention, with date(s).

Describe any external disclosure of invention, place, date, circumstances of disclosure, with copy of NDA.
None

Does plan exist to publish, disclose or sell? No ☑, Yes ☐, If yes, where and when?_____

Was invention jointly developed with participation of inventors from outside AMD: No ☑, Yes ☐,
If yes, Company name_____,
If yes, name of AMD business contact and development contract no._____

I have read and understood this ~~disclosure~~ and read and signed each page of the attachments:

Witness 1
signature:_____ Date:_____
Printed name:_____ Employee #:_____

Witness 2
signature:_____ Date:_____
Printed name:_____ Employee #:_____

EXHIBIT
D